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ABSTRACT

A series of teacher workshops was held at 10 locations throughout Texas for the purpose of disseminating a set of self-contained modules on consumer skills for industrial arts students. At the individual workshops, each teacher was given up to 20 copies of each of the bilingual modules to enhance the possibility that they would be used in classrooms. The remaining workshop activities concentrated on specific techniques for the classroom use of the modules and on developmental strategies for new modules. The main evaluation measures for the project consisted of two elements, an initial evaluation at the end of each workshop and a second evaluation after the modules had been in use. Most of the teachers surveyed felt that the materials would be useful. The few negative comments dealt with the reading level of the Spanish text. After the materials had been used at the junior and senior high school levels, a follow-up questionnaire was administered to 92 randomly selected workshop participants. Again, the responses were supportive of the materials. (Appendixes to the report include the initial and follow-up evaluation instruments; respondent comments on the evaluations; and new bilingual modules dealing with buying used cars and trucks, clear wood finishes, wood screws, and nails.) (MN)

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FINAL REPORT

Project No. 22420004

CONSUMER EDUCATION
FOR
TEXAS INDUSTRIAL ARTS
II

A Research Project in
Vocational Education

Conducted Under
Section 132 of Public Law 94-482

Glenn E. Baker
John C. Dugger III

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June 30, 1982

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ACKNOWLEDGEMENTS

The authors of a report such as this generally receive the credit (or the notoriety) for the undertaking. However, a number of people have contributed to the success of this project and should receive considerably more mention than is customarily given. These people are due only the highest praise; the project was an unqualified success and they contributed greatly to it. First, the authors would like to acknowledge and thank Vicki Radke Taylor who served diligently as the "project secretary" for most of the duration of the project. Donna Fairbanks also did yeoman service filling in during times of need. Both worked with constant revisions, clanging telephones, shuffling students, wandering professors, and babbling recorders and enabled the project to continue successfully during times of difficulty and confusion. We would also like to extend special thanks to Nancy Christian who translated our new materials in such a superlative fashion, and to Daniel Jaime of San Antonio who edited the translation for our Texas dialect. Daniel, in particular, has worked with this project for two years and has always been a strong, positive and disgustingly optimistic source of assistance.

It should also be pointed out that this project is an unusual project. Not only has it been a distinct success in terms of the normal and traditional evaluation processes, but it can also feasibly estimate a dollar return on a dollar invested and demonstrate a sound investment. It has been an interesting research project and information of considerable interest is now beginning to appear in the various magazines and journals in the field. These articles publicize some of the findings and methods developed in this series of projects, and should begin to have considerable impact upon practices in the field in the years to come.

G.E.B.
J.C.D.

CONSUMER EDUCATION
FOR
TEXAS INDUSTRIAL ARTS
II

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UNIT I
STATEMENT OF THE PROBLEM

Results of research projects frequently make little or no impact upon educational settings for several years. Various reasons exist including the lack of publicity, the time needed to plan and implement changes from current practices, general lack of communications, lack of funds for providing materials and lack of time by teachers and administrators to implement the new materials.

During the 1980-81 school year, a research project (Baker, et al, 1981), Consumer Education For Texas Industrial Arts (CETIA), was funded by the Texas Education Agency's Research Coordinating Unit (RCU) to develop self-contained modules for classroom use to address consumer education in industrial arts. The content modules were selected to be appropriate to the widest array of industrial arts courses in the state. The CETIA project was successfully completed in June of 1981, and mailed a limited number of the developed modules to each school district within the state. The objectives of the CETIA project were to: (1) identify eight to ten modules most widely adaptable into industrial arts; (2) to develop these modules in English/Spanish texts; (3) to test the modules in a school setting; and (4) to distribute the refined and tested modules to all school districts within the state of Texas. The project was completed successfully and accomplished all of these objectives. However, realistically the accomplishment would probably have had comparatively little effect on more than just a few school districts.

Adaptation of these innovative content modules into curriculum was not assured. The adaptation of these materials was limited by the fact that many administrations do not transmit materials received in the mails

effectively to the people who would utilize them. A deterrence to the use of the materials included the lack of direct contact or experience by the teachers with the modules in order to learn how to effectively use them, and the lack of funds or facilities at the local level to produce the materials in classroom quantities. The main purpose of the project for the 1981-82 school year was to continue the efforts at making the results of the first CETIA project known to the school districts in the state.

BACKGROUND

Increased inflation has accentuated the need for individuals to use wise consumer practices in order to cope with the increased cost of living. The energy crises have intensified the need for consumers to be able to select and to purchase products that conserve energy or utilize it more efficiently.

However, too many individuals still lack the technical background to make judgements concerning industrial goods and services. While industrial arts students may have these necessary backgrounds due to the development of their technical competencies, they may not be able to quickly and efficiently develop this knowledge into wise consumer practices. Industrial goods and services range from energy efficient devices for home use to small electronic appliances that are the products of both energy and manufacturing industries. The knowledge of industrial quality becomes essential to wisely select or purchase the wide range of industrial products and services.

Today, trends indicate that energy costs and economic problems will intensify. The net result for consumers will be an increased need for wise buying and using practices. For youngsters who are students now but who will become consumers in the near future, there will be a greater

need for wise buying skills and less time to develop them. Therefore consumer education elements take on an increasing relevance for program content.

Industrial arts is an ideal subject for consumer education. It has traditionally sought to develop a wise consumer of industrial products. Goals defined for industrial arts from 1937 through the past several decades (Groneman & Hostetler, 1953; Minelli, 1968; and AIAA, 1976) have stressed this development.

The most recent of these, the 1976 AIAA guidelines, specifically address the issue: "...develop attitudes, individual involvement, and a realistic evaluation for consumer awareness. The student evaluates industrial products by judging the quality of construction, the selection of materials, and the fulfillment of function" (page 14). While all these guidelines stress developing consumer awareness and ability, they do not provide specific methods or content. One reason is that the field of industrial arts covers such a wide array of courses. Typical course offerings include such topics as construction, manufacturing, woods, metals, power and energy, and drafting. The list in Texas encompasses approximately 40 separate course titles from grade 7 through 12 (Texas Education Agency, 1977). In Texas, for example, these 40 separate courses include an enrollment of over 200,000 students, with some 80,000 enrolled in the junior high or middle school level.

At the national level, most efforts have focused upon philosophical questions and efforts to implement sweeping curriculum changes. Virtually nothing has been developed to aid the teacher to directly address many of the state goals of industrial arts.

Some common industrial arts content is apparently related to consumer functions and many teachers feel that they do address these goals. Yet there is no consistency or common base of content and method from which

broad improvements can be developed. Further, students usually do not learn things well unless guided directly toward learning them; the concept that theory that is learned is automatically transferred to its application is false. Faculty psychology, as a viable learning theory, was proven invalid 60 years ago.

Specific methods, content and materials are needed now. These must be directly adaptable for immediate classroom use. With approximately 200,000 students involved in industrial arts, specific needs persist for materials that: could fit into existing courses without overwhelming them; relate consumer education to energy conservation and efficient utilization; and, are appropriate for those grade levels before dropouts or academic specialization occur.

In Texas, another problem exists. Many students drop out of school to enter the labor market long before they graduate from high school. These are often those who need practical education the most: the disadvantaged, the academically deficient, and cultural minorities. The greatest drop out rate is around the 9th grade.

The talented, at the other extreme, enter very specialized academic programs at the 9th or 10th grade levels. These are directed at college preparation and usually stress a traditional academic subject.

The net result is that any practical, applied educational experience related to energy or consumer education would be most effective at the middle school or junior high school level. Further, most school curriculum are already crowded; there is a resistance to adding more courses.

Industrial arts programs are common to all regions of Texas. A variety of courses is offered in schools ranging from tiny, rural schools to teeming, urban schools in both suburban and inner-city settings.

Students vary in abilities from mainstreamed, mentally handicapped to the brilliant. Others with physical handicaps are commonly enrolled as well. In border regions, Spanish may be heard in industrial arts classes as much as English.

It is common practice in the school to identify potential dropouts and to place them in industrial arts courses to receive a modicum of skill and work-success-safety attitudes. In this respect, the clientele for such consumer education content for industrial arts would likely be those who need it the most.

As previously mentioned, the adaptation of the material developed in the CETIA project was not assured by mailing copies to each district. Adaptation was limited by the fact that many administrations do not transmit such materials effectively to their teachers. Other deterrents to use included the lack of direct contact or experience by the teachers with the modules, and the possible lack of either funds or facilities at the LEA to produce the materials in classroom quantities.

Also, publicity of such projects occurs after the work has begun and little notice was generated prior to the completion of the project. The bulk of the publicity and information occurred after the termination of the first project. A need existed to make these innovative materials more available and to prepare teachers to use them. To extend the effects of these materials, some action beyond simply mailing copies to school districts seemed appropriate. To this end, the methods which reach classroom teachers would seem to be most efficient. Ten workshops were proposed; each would be held at local sites and each was negotiated individually to be at a time and length most suitable for local needs.

UNIT II PROCEDURE

The primary goal of the project was to disperse the materials developed in the previous year. Few considerations were given to testing the materials or other pure research factors because these had been addressed in the previous year. To achieve the primary goal, a specific list of five objectives were generated. These were:

1. To extend the range, acceptance, implementation, and impact of materials developed under a previous research grant through a series of workshops.
2. To acquaint teachers with both the knowledge and use of the materials and, where appropriate, how to develop additional materials for individual communities.
3. To increase the effect of consumer education content in industrial arts.
4. To increase the effect of bilingual consumer education content in industrial arts.
5. To concentrate these effects in the inner-city or dense urban areas where the needs are considered greatest.

To achieve these objectives, the project was divided into eight steps. These were: (1) prepare materials for the workshops; (2) identify and select workshop sites; (3) arrange the workshops; (4) conduct the workshops; (5) identify the new content modules; (6) prepare and disperse the new materials; (7) evaluate the results; and (8) publish the results. Each of these steps was completed at or near the anticipated time on the projected schedule.

Prepare Workshop Materials

To minimize the effects of inflation and to make the process the least expensive and most efficient, all the modules planned for use were printed shortly after approval of the project was received. The projections for use were to try to reach 200 teachers with classroom quantities of the materials. Realistically, many teachers would not accept the materials and many would not take classroom quantities. However, it was hoped that 200 teachers would dispose of 15 copies each in classroom use. Therefore, 3,000 copies of the modules were printed in preparation for the coming workshops.

Other materials needed for the workshops included blank paper for the development activities, pencils, evaluation forms for use at the conclusion of each workshop, and outlines and transparencies for use in explaining the analysis and development sequence were also prepared.

Identify, Select and Arrange Workshop Sites

To accomplish this phase, two factors were considered. First, a process was needed to reach substantial numbers of teachers who might implement the materials into their classes. Second, emphasis was needed in regions where Spanish was a common second language. The priorities for dispersing the consumer oriented modules thus related to two primary factors. The first dealt with population--how to reach the largest numbers with the most efficient expended effort. The second factor dealt with dispersing the bilingual materials to the areas of the greatest potential need for the bilingual materials. Hence, priority was given to locations where the concentration of Mexican/American population was the greatest. The demographic qualities of the population of the state of

Texas were examined for basic population densities and then compared with the population densities of the Mexican-American population. A list of target cities and/or regions was developed. A list of approximately 8 prime locations was developed from examination of these two demographic factors. However, two regions were eliminated because they have no significant numbers of industrial arts programs. Within the six remaining areas, key school districts and industrial arts regional associations were identified. These are shown in Figure 1.

FIGURE 1
TARGET AREAS AND WORKSHOP LOCATIONS

Target Areas	Workshop Site	Host Organization
Houston	Alief	Alief ISD
	Cypress	Cypress-Fairbanks ISD
Dallas-Ft. Worth	Ft. Worth	Ft. Worth ISD
San Antonio	San Antonio	San Antonio ISD
El Paso	Ysleta	Ysleta ISD & El Paso IA Assn.
Corpus Christi & lower coast	Bobstown	Coastal Bend IA Assn.
Austin	Austin	Austin ISD
Lubbock & high plains	Lubbock	South Plains IA Assn.
Others: State-wide	Texas A&M	Texas IA Assn. - State Conference
Eastern Coast	Beaumont	Beaumont ISD

Once the list of key groups was developed, a questionnaire was formulated and mailed to 30 vocational directors, administrative personnel or regional officers of industrial arts associations. From the six identified target areas, approximately half of the 30 questionnaires were returned with responses that indicated a desire to have a workshop. However, some problems were apparent as to possible dates and times. For example, the only possible date for a workshop in Dallas was the same as the only possible date for a workshop in San Antonio. San Antonio was selected because of the higher

density of Mexican-Americans and because the materials had been field tested in San Antonio and would likely receive a higher acceptance rate than in Dallas.

Eight workshop locations were identified from the survey. Negotiations were begun to arrange the details of each workshop. Also, negotiations were initiated with other key groups within the target areas to implement at least two more workshops. Negotiations were terminated with only one ISD due to lack of interest. The remaining groups (Dallas, Victoria, and Midland-Odessa) are being considered after the termination of this project. Once it was evident that workshops could not be conducted within the primary target areas, two additional locations were selected. These last two were at the state industrial teachers' conference and in an inservice setting with the Beaumont schools. The industrial teachers' conference is sponsored by the Texas Industrial Arts Association and would make the session available to teachers from all regions in the state. The Beaumont location was accepted from exposure at the teachers' conference and would serve to expose the project to a large number of teachers in industrial arts as well as other areas. From ratings and reactions at other workshops, it was found by then that teachers in almost all vocational subjects found use for several of the modules and almost all were interested in the process used for developing new content.

Workshops were begun in late August of 1981. Three were conducted during this period. Two were conducted in October and February. One each was held in November, January and March.

Conduct Workshops

Industrial arts teachers were found to be very practical. It became evident at the first workshop that industrial arts teachers were less receptive when given the theory of the module development before the other materials. At the second workshop, the sequence was changed and was used

throughout the remainder of the 9 remaining workshops. The revised sequence allowed the teachers to apply the materials first. It was observed that their interest in the theory was increased and they were responsive and receptive to the materials using the revised sequence. This sequence consisted of first passing out one copy of the modules to each teacher participating in the workshop. The teachers were given approximately 10 minutes to familiarize themselves with all 8 modules and select one and read it and react to it the same as would their students.

After a chance to review the materials, the participants were broken into small groups of approximately 4 to 8 individuals. These groups were told that the material was more effective if used directly, such as a base for a lecture. Each group was then asked to develop a list of three methods of directly applying the content of the modules to their classes. A spokesperson was selected in each group and given the task of recording the methods selected by the group. The groups were then given approximately 15 minutes. Most groups finished sooner, but most developed a list of more than 3 methods to apply the materials. The leader of each group was then asked to read the list of methods that his or her group had developed to the rest of the workshop participants. The composite list of potential methods of applying the materials is given in the evaluation unit of this report.

After the teachers had been given the opportunity to familiarize themselves with the modules and explore methods of applying them in a classroom setting, the theory of developing consumer content was explained to them. The analysis sequence was presented which portrayed the importance of examining the needs of the students rather than accepting traditional content organization was stressed. Also, the concept of

teaching students to look for options on quality for limited or special use was examined with each group. Then, the process of equating the consumer analysis to teaching problem solving or the scientific method was disclosed. This usually generated considerable interest and a visual comparison was displayed. This is shown in figure 2.

COMPARISON OF CONSUMER ANALYSIS TO
PROBLEM-SOLVING AND SCIENTIFIC METHODS

<u>Consumer Analyses</u>	<u>Problem Solving Method</u>	<u>Scientific Method</u>
1. Recognize the need	1. Set a goal the student can attain	1. Observe and recognize the problem or need
2. What are the choices	2. Define a task that must take "new" actions.	2. DEFINE & REFINED the problem to specifics
3. Which one is "best"?	3. Advise on options; student selects "best" method	3. Formulate the hypothesis
4. Apply or test--try it	4. Student tries out "best" method	4. Develop methods and test the hypotheses
5. Conclude--did it work?	5. Did it work?	5. Conclusion

A brief break was taken, then the workshop participants were again broken into small groups. Each group was asked to select a topic that they would like to have in their programs, but which was not in the 8 module topics they had. They were then asked to outline the content of their new topic using the analysis system previously explained. These topics were also read by the groups spokesperson to the other participants at the conclusion of the workshop.

Finally, each participant at the workshop was asked to complete an evaluation form, which is explained in the evaluation section of this report. After the completion of the evaluation form, the program was returned to the host organization and the program was completed.

Select New Modules

The proposal projected the development of up to five new modules on a format and process the same as the previous project. The new topics were chosen on the basis of two frequency aspects. The frequency with which a topic was selected at all of the ten workshops was one factor while the frequency the topic was selected within a given workshop was the second factor. The selection of the new module topics was made in February when eight workshops had been completed. When both factors were considered, three topics became very prominent. These three were: buying used vehicles; buying nails, and buying screws and fasteners. The fourth new module was developed from a clearly emergent topic concerning finishes in general. However, the field of finishes is too broad and the most logical topic concerned clear finishes on woods. There was no consensus or apparent grouping that made the selection of a fifth topic possible. Therefore, no fifth new module was developed.

Prepare and Disperse New Modules

The four new topics (buying new or used vehicles, nails, clear finishes, and screws and fasteners) were developed into modules following the same analysis sequence used in developing the previous 8 during the first project. This sequence involved assessing the anticipated needs of the youthful consumer, comparing the intended use and cost with possible alternatives in quality, shopping around and considering the hidden costs are needs for accessories and safety equipment.

The analysis was used to derive the content which was then outlined. The text material was generated to complete the outline and then edited for objectives, content, and reading level. The revised text was typed in draft form and was then delivered to the project translator

The project translator was Mrs. Nancy Christian of Bryan, Texas. Mrs. Christian is a native of South America and is married to a professor of Spanish at Texas A&M University. She has worked as translator with several projects in Texas schools and developed a high quality of Spanish language text for this project.

Each Spanish text module, along with its English language counterpart, was then sent for editing and review to Mr. Daniel Jaime of San Antonio, Texas. Mr. Jaime is a bilingual junior high school industrial arts teacher in the San Antonio district. He also assisted the previous CETIA project in field testing and reviewing the previous modules. Mr. Jaime is highly qualified to deal with both the regional Spanish dialect and the technical content.

After both language portions were prepared, the material was illustrated and organized for interest and appeal. An improved visual appearance was added because the project had access to improved type setting equipment. Each new "smart buying series" module was prepared using the same sequence of text, study sheet, and student quiz as was previously used.

Once the layout was completed for all four of the new modules, they were sent to a printing center where 400 copies of each module were printed. 40 copies of each module set were, or are being delivered to the leaders at 9 of the workshop locations. They are requested to disperse the materials through the organization that originally hosted that particular workshop. Of course, the recipients have the copyright abilities to reproduce materials at their own expense for extended and continued use. The remaining 40 copies are being held in the Industrial Education Department at Texas A&M University. This department was the host for the 10th workshop held at the Industrial Teachers Conference. These 40 copies will be dispersed at state and national vocational conventions by the project staff.

Summary of Procedure

The project addressed a primary goal of implementing previously developed materials immediately into classroom settings to offset the time lag of up to several years that is typical of most research efforts. Specific project objectives were identified and eight steps toward attaining these objectives were defined. The first four steps related to locating and conducting the workshops to reach the largest numbers of teachers with priorities given to regions with probable needs for English/Spanish bilingual materials. This was done by conducting workshops at each of 10 locations throughout the state. This acquainted large, effective numbers of teachers directly with the modules. At each workshop, each teacher was given up to twenty copies of each module. By furnishing each teacher with classroom quantities, the ability to utilize the materials directly in the participants classroom was greatly enhanced. A part of the workshop activity allowed each teacher to complete one or more modules just as a student would. The remaining activities concentrated on specific techniques for classroom use and developmental strategy for new materials. This part familiarized the participants with the analysis sequence developed by the project for identifying appropriate content. A final optional activity was to form teams of approximately four members to identify a new content module and to develop a rough outline of it during the workshop.

The fifth and sixth steps were directed at identifying, preparing and dispersing the materials developed from the grassroots input at the ten workshops. The seventh step was concerned with evaluating the project during its duration and after the materials had been given the opportunity to be used. This topic is addressed in Unit III of this report. The final step related to publicizing the results and is addressed in Unit IV of this report.

UNIT III EVALUATION

The main evaluation measures for the project consisted of two elements; an initial evaluation at the end of each workshop, and the second after the materials had been in use. Each workshop participant was requested to complete an evaluation form at the conclusion of that workshop. However, this evaluation was done before the material was used by the individuals. To explore the reactions to the materials once they were used, a mailed evaluation was solicited in May of 1982. The evaluation form was similar to the initial form used at the workshops. Both forms are included in Appendix A and B respectively.

Ten separate workshops were conducted in order to disseminate the 8 modules developed as a result of the CETIA project. Table 1 identifies the locations and the number of participants in each workshop. A total of 200 participants were proposed; a total of 274 participants were actually exposed to the CETIA materials, which exceeded the expected participation by 37%.

TABLE 1
LOCATION AND NUMBER OF PARTICIPANTS
IN EACH WORKSHOP

Location	No. of Participants
1. Alief	34
2. Austin	18
3. Beaumont	51
4. Cy-Fair	22
5. Ft. Worth	65
6. Lubbock	15
7. Robstown	15
8. San Antonio	30
9. Texas A&M	8
10. Ysleta	16
TOTAL	274

Initial Evaluation

An initial evaluation was conducted at the end of each workshop. A prepared evaluation form consisting of three parts was employed in order to gather the perceptions of the workshop participants regarding the CETIA materials. See Appendix A.

The first part of the evaluation asked each participant to rate the perceived usefulness of the CETIA modules on a 4 point Likert-type scale. The scale anchors ranged from "Least Desirable" to "Most Desirable." The seven questions which were rated by each workshop participant were:

1. Are the topics appropriate for class use?
2. Is the content appropriate for class use?
3. Is the reading level appropriate?
4. Are the units appropriate for individual study?
5. Are the units appropriate for class or group use?
6. Overall, how would you anticipate your students' reaction to these?
7. What is your overall reaction to the modules?

The second part of the initial evaluation form consisted of two questions requiring yes-no responses. These two questions addressed the module content and perceived usefulness of the modules to the participants existing programs. The questions were:

8. Will these units add content you would not have covered?
9. Will these units detract from your program?

The third part of the initial evaluation involved soliciting general comments concerning the CETIA materials which would serve to explain responses and/or address problems not addressed by previous questions. The identification of positive and negative comments and the tallying of

these comments served as a subjective method of soliciting evaluation input.

Initial Evaluation Results

Over 75% of the participants who made initial evaluations were teaching industrial arts. The remaining portion was composed of teachers from other vocational areas, and supervisory personnel. Since the modules were designed to be used in industrial arts classes, the responses provided by more than 200 industrial arts teachers helped assure that the module evaluations were valid.

Mean responses for each of the seven questions in the first part of the initial evaluation were calculated and are displayed in Table 2. The means of six of the seven ratings was above three on the four point Likert-type scale, which suggests a generally favorable reaction. A "Most Desirable" rating carried a weight of four and a "Least Desirable" rating carried a weight of one. Question six had the lowest mean rating which was 2.80. This question asked the respondent to anticipate the students' reaction to the modules. Question three and question five

TABLE 2
MEAN RATINGS FOR THE LIKERT-TYPE
RESPONSES

Question Number	Mean	Std. Dev.
1	3.28	.74
2	3.26	.75
3	3.36	.75
4	3.32	.75
5	3.35	.78
6	2.80	.78
7	3.10	.97

received the highest mean ratings. These questions asked whether the

reading level was appropriate for class or group use.

Frequencies were calculated for the two "yes-no" questions in the second part of the initial evaluation. Table 3 identified the number of participants who responded either yes or no to questions eight and nine. Question eight asked if the modules would add content not normally covered, and question nine asked the respondents to indicate whether the

TABLE 3
FREQUENCY OF RESPONSES
TO "YES-NO" QUESTIONS

Question Number	Number Circling "Yes"	Number Circling "No"
8	224	41
9	10	261

modules would "detract from your program." In some cases, participants failed to respond to either question(s) eight and/or nine.

Of the 274 participants, 83 wrote comments in the space provided. Several respondents wrote that they would try the materials and see what happened. Several also indicated that they taught drafting and could not use the modules. A large group wrote that the modules would be excellent for middle schools, but not as useful in the high schools, and several offered an explanation for the low rating of question number five. They suggested that the students would perceive these modules as "book" work and not a hands-on experience.

The few negative comments dealt with the reading level of the Spanish. Several respondents wrote that the reading level of the Spanish was too high. Some also indicated that the quality varied between modules. The comments are listed in Appendix C.

Methods of Use

At each workshop, the participants were broken into small groups and asked to list ways of directly using the materials. One example (using the modules as a lecture guide) was given. Each group was then asked to list at least three methods of use. Most groups generated a substantial list and each group shared its list with the others in the workshop. This maximized the knowledge of ways to implement the materials.

As could be expected, there was considerable duplication both from group to group within a given workshop and also from workshop to workshop. However, a composite, edited list yielded 37 methods of directly employing the materials into a standard program. This list is shown in Appendix E.

Follow-Up Evaluation

A follow-up evaluation aimed at obtaining industrial arts teachers' perceptions regarding the CETIA materials was conducted after the workshop participants had an opportunity to use the materials in their classrooms and laboratories. The population for the follow-up evaluation consisted of the 274 workshop participants. The sample for this evaluation consisted of 92 randomly selected participants.

The Instrument

The follow-up instrument (Appendix B) was similar to the initial evaluation instrument. Both instruments consisted of three parts; a "yes-no" section, a Likert-type response section, and a section reserved for general comments.

The "yes-no" section of the follow-up instrument was designed to determine whether the respondent was a middle or high school teacher, an industrial arts or other vocational area teacher, and whether the

materials had been used or were destined to be used in his or her program. The five "yes-no" questions were:

1. Do you teach junior high school?
If not, what level _____?
2. Do you teach industrial arts?
If not, what subject _____?
3. Did you use these materials in your program?
4. Do you plan to use them in the future?
5. Did these units add content you would not have covered?

The section requiring Likert-type responses consisted of nine statements designed to determine the appropriateness of the modules for classroom use. Four possible responses were provided for each statement. The possible responses were "Strongly Disagree," "Disagree," "Agree," and "Strongly Agree." The seven statements included:

6. The topics were appropriate for use in your classes.
7. The content was appropriate for class use.
8. The bilingual format was helpful for some students.
9. The reading level was appropriate.
10. The modules were appropriate for individual instruction.
11. The modules were appropriate for class or group use.
12. The modules identified content which is not normally covered.
13. The students reacted favorably.
14. The use of the modules resulted in class improvement.

The final section of the instrument provided a space for comments. This section was included since the comments provided by the respondents could prove helpful in interpreting the data.

The coded instrument along with a return envelope was mailed to each of the potential 92 respondents. Approximately two weeks later, a second instrument was mailed to those members of the sample who had not

returned the first instrument. The total time allotted for data collection was four weeks. A return rate of 51.9% percent was attained for this evaluation.

Follow-Up Evaluation Results

The responses provided by the sample were analyzed for several effects. These included the type of teacher (industrial arts or non industrial arts) and the grade level (junior high or senior high). The data also were analyzed to ascertain the effectiveness of the developed materials.

Table 4 reports the percentages of all respondents who indicated "yes" for each of the questions on the first part of the instrument. 44.1 percent of the sample reported that they taught in junior high schools. Industrial

TABLE 4
PERCENTAGE OF "YES" RESPONSES
TO THE QUESTIONS IN SECTION ONE
OF THE INSTRUMENT

Question Number	Percentage of "Yes" Responses
1	44.1
2	82.4
3	47.1
4	70.6
5	58.8

arts teachers comprised 82.4 percent of the sample. 47.1 and 70.6 percent respectively reported that they had used the CETIA materials and intended to make use of the materials in the future. 58.8 percent of the sample indicated that the modules added content to their programs.

Table 5 reports the same percentages for the respondents who taught industrial arts on the junior high school level. When compared to the

responses by the total sample, the junior high school industrial arts teachers reported a significantly ($p < .05$) higher percentage of "Yes" responses to questions three and four.

TABLE 5
PERCENTAGE OF "YES"
RESPONSES REPORTED BY JUNIOR
HIGH SCHOOL INDUSTRIAL
ARTS TEACHERS

Question Number	Percentage of "Yes" Responses
1	100
2	100
3	57.1
4	83.2
5	62.8

The second section of the follow-up evaluation consisted of ratings of statements provided by respondents on a four point Likert-type scale. Table 6 reports the mean ratings and standard deviations derived from the sample. The results suggest that the respondents tended to agree with all the statements.

TABLE 6
MEAN RATINGS AND STANDARD
DEVIATIONS FOR THE LIKERT-TYPE
RESPONSES

Question number	Mean	Standard Deviation
6	2.89	.80
7	2.93	.68
8	2.70	.91
9	2.70	.82
10	3.00	.78
11	3.00	.67
12	2.78	.80
13	2.76	.91
14	3.02	.85

Table 7 reports the means and standard deviations for the responses provided by junior high school industrial arts teachers. The responses by junior high industrial arts teachers did not differ significantly from the responses provided by the high school teachers or the total sample.

TABLE 7
MEAN RATINGS AND STANDARD
DEVIATIONS FOR RESPONSES
PROVIDED BY JUNIOR HIGH
SCHOOL INDUSTRIAL ARTS
TEACHERS

Question Number	Mean	Standard Deviation
6	3.00	.43
7	3.00	.43
8	3.08	.90
9	2.92	.79
10	2.83	.94
11	3.08	.29
12	2.58	.67
13	2.92	.81
14	2.56	.90

A generally favorable response is indicated for all of the questions. The variance of these means is partially explained by the fact that the primary target level of the materials was at the seventh and eighth grade levels in the junior high school programs. However, a large percentage of the workshop participants were high school level teachers. Hence, both the content and reading levels could have been below their needs, although the reading level was highly regarded by the majority of the respondents.

The third section of the follow-up evaluation consisted of comments provided by the respondents. The positive comments supported the integration of the materials into the industrial arts programs or using the materials

to supplement the existing industrial arts programs. The negative comments suggested that the materials could not be used in drafting classes or that the Spanish should be eliminated or that the reading level of it be lowered. The comments, although not as numerous, tended to support the comments provided by the initial evaluation participants. Appendix D lists the comments provided by the follow-up evaluation respondents.

Evaluation Summary

Both the initial and follow-up evaluations were supportive of the use of the CETIA materials in industrial arts classrooms and laboratories in Texas. The data analysis, however, suggested that there is slightly more support for use of the materials in junior high industrial arts programs than for high school industrial arts programs.

The respondents tended to feel that the bilingual format could have been eliminated in situations where there were few Spanish-speaking students. Several respondents felt that the Spanish reading level of the modules may be too high for middle school students. Some industrial arts course areas such as drafting may not be amenable to the content of the modules.

UNIT IV DISCUSSION AND CONCLUSIONS

This project was undertaken to continue and extend the efforts of the previous project which developed and tested the consumer education modules. Specifically, this project undertook to:

1. To extend the range, acceptance, implementation and impact of materials developed under the previous project.
2. To acquaint teachers with both the knowledge and use of the materials and, where appropriate, how to develop additional materials for individual communities.
3. To increase the effect of consumer education content in industrial arts.
4. To increase the effect of bilingual consumer education content in industrial arts.
5. To concentrate these effects in the inner-city or dense urban areas where the needs are considered greatest.

Summary

The project contracted to conduct 10 workshops and to reach approximately 200 teachers each of which would be provided with classroom quantities of the developed materials. The project achieved these projected goals in that it conducted 10 workshops, it reached 274 classroom teachers, and provided an average of 10 to 15 copies per teacher. In fact, by reaching 274 teachers, it reached 37% more than its stated target. In addition, the project reached more than just industrial arts teachers. At least two of the workshops included teachers from several vocational subjects such as home economics, vocational agriculture, trade and industrial education, special needs programs, and so forth.

Responses to the initial evaluation are very favorable to the materials. Another point to indicate a favorable reaction to the project concerns the high degree of interest and receptiveness to the project on the part of vocational directors and industrial arts supervisors. In almost all cases where a sponsored workshop could not be negotiated, the individuals have maintained contact and interest in a workshop conducted after the duration of the project. In only one instance have the negotiations for a workshop broken down completely.

The results of the survey indicate that more than 50% of the respondents have already put the consumer education materials in use. In addition, more than 80% of the junior high school teachers and more than 70% of the high school teachers intend to use the materials in the future. It should be remembered that some teachers attended workshops late in February and March and only had the materials for a short period of time. These, and possibly other teachers, received the materials after their programs had been planned and were well under way. Possibly, they considered it inappropriate to add materials at that stage in their programs and preferred to cycle the materials into the next term.

The comments made on the two evaluations and the lists of methods developed in the workshops all point to a high degree of utility for the materials. While some teachers, particularly those who teach high school drafting, perceive little usefulness for them, the majority of teachers obviously do see varying, but positive, degrees of acceptance.

The return rate on the survey evaluation was considered acceptable. While it was somewhat disappointing (51.9%), the initial survey was not sent out until the last two weeks of May when teachers were likely preoccupied with closing out the year. This year, most schools ended their year less than two weeks after the questionnaire was sent. Also,

the questionnaire was sent to home addresses and many of the teachers undoubtedly changed their addresses between August and May. With those conditions, one could not realistically expect high return rate.

Junior high school teachers indicated significantly higher ratings for current use as well as intent of future use than did the high school teachers. However, the responses in both categories from both groups is very high (more than 70%). The significantly higher ratings by the junior high school teachers suggest that the materials are more appropriate at that level, as they were designed to be. One should remember that the primary target addressed by these materials was the junior high school level.

The overall response to the Likert style questions was generally favorable. All of the mean averages were above 2.5 with most averages being above 3, which indicated a very favorable reaction for the most part. The lowest items were on the elements that were not considered critical such as "did the modules add content not normally covered," and so forth. The key questions in this section related to: question 8, whether or not bilingual material was helpful; question 13, whether student reaction to the modules was favorable; and question 14, if using the modules provided class improvement. The means on these questions were 2.7, 2.76, and 3.02 respectively. These means would suggest a favorable reaction to the factors critical to continued use of the materials.

Publicity

Results of the project will be published in several forms. Of course, copies of the final report will be submitted to the RCU of the Texas Education Agency for their distribution processes. In addition, the project staff will carry copies of the final reports and summary

reports of the two CETIA projects to the national conventions of the American Industrial Arts Association and the American Vocational Association. These reports will be displayed at the booths that this department maintains at these conventions.

Five articles have been developed to publicize the efforts of the project staff and the project. One article describing the overall CETIA project was published in the Texas Industrial Arts Association Journal in the spring of 1982. In addition, an article on the analysis process used in the project has been accepted by Industrial Education magazine and is pending publication. Also, an article describing the selection of the consumer topics has been accepted by the Epsilon Pi Tau Journal and is scheduled for publication in the summer of 1982. Two other articles, one on problem solving, and one on the bilingual effects have been written and submitted to Man Society Technology and Epsilon Pi Tau Journal respectively. They are being considered at this time. Further, an additional article summarizing the final results of the project will be submitted some time late in the fall.

A presentation proposal has been tentatively accepted by the Industrial Arts Division of the American Vocational Association for the December, 1982 program at St. Louis, Missouri. This program will feature the testing of industrial arts objectives through research projects and will largely feature the efforts of the CETIA project. Materials from this project, including final reports and the modules, will be displayed at the presentation and limited numbers will be distributed. A similar program will be proposed for the national conference of the American Industrial Arts Association scheduled for March, 1983 in Milwaukee, Wisconsin.

Conclusions

From the generally favorable reactions to the modules, the workshops, the analysis sequence, and the follow-up evaluation, it is concluded that the project accomplished all of its objectives. These results make it obvious that the project has had a substantial, direct impact upon industrial arts in the state of Texas. The materials have been received by large numbers of teachers, and the majority of industrial arts teachers at the junior high school level (which was the targeted level) are using them and the indications are that they will likely to continue to use them. There is no real doubt that the project did and will continue to increase the application or implementation of consumer education content in industrial arts by direct and indirect means.

The implications of the continued effect of the CETIA project in terms of consumer education and bilingual development, are substantial. The secondary effects include the inquiry into the source of the materials as teachers not previously exposed learn of the materials through conversations and visitations. The publicity provided through the publication efforts of the various project staff will likely draw further attention at both state and national levels. In addition, four districts have retained a degree of interest for members of the project staff to conduct workshops after the project has been terminated. It is likely that one or more of these will be implemented in the future. Another indirect effect lies in the possibility that more than 200 teachers have been made more sensitive to the need to include consumer content as a direct part of their instructional program.

Based on the estimates of a savings of \$10 per student, and a typical 100 students per teacher, figures as to the savings for this

year and next year can be projected from the evaluation results. If 50% of the 274 teachers employed the materials immediately, a net savings this year of more than \$137,000 would be realized by the citizens of Texas. Projecting the same figures for more than 80% use for next year, this figure would change to \$219,200. Using these figures, the projected savings for a two year period would be \$356,200. These figures would provide a ratio of returns to costs of almost three to one at a minimum and seven to one for a two year effect. The long term effect will likely increase over five or more years as more and more teachers become acquainted with the materials and the materials filter into teaching practices at universities. One could logically conclude that the project has been a success in terms of research, implementation, the acquisition of new knowledge, support for great social issues, and of direct financial returns as well. It is unlikely that many research projects can derive similar conclusions. These effects will continue to enhance the reputation of industrial arts and vocational education in Texas.

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APPENDIX A
INITIAL EVALUATION
INSTRUMENT

CETIA
Workshop Rating

33

Location _____ Date _____ ISD _____ Region _____

Workshop Units 1. Modules _____ 2. Analysis _____ 3. New Modules _____

Please circle your rating for each of the following factors:

	Least Desirable		Most Desirable	
1. Are the topics appropriate for class use?	1	2	3	4
2. Is the content appropriate for class use?	1	2	3	4
3. Is the reading level appropriate?	1	2	3	4
4. Are the units appropriate for individual study?	1	2	3	4
5. Are the units appropriate for class or group use?	1	2	3	4
6. Overall, how would you anticipate your students' reaction to these?	1	2	3	4
7. What is your overall reaction to the modules?	1	2	3	4
8. Will these units add content you would not have covered?			Yes	No
9. Will these units detract from your program?			Yes	No

If so, how?

10. Other Comments:

NOTE: You will be sent another rating form in March. This will help determine the actual use, quality and improvements needed. Please help us by listing your address below:

Name _____ School Address _____
Home Address _____

APPENDIX B
FOLLOW-UP EVALUATION
INSTRUMENT

Consumer Education for Texas
Industrial Arts

Earlier this year, you attended a workshop where you were given some modules on consumer education topics. In order that we may better serve present and future users, would you please complete this evaluation form.

An addressed, stamped envelope is enclosed for your convenience. Coding has been used to allow for follow-up activities, but your responses will be treated confidentially. Thank you for your prompt response.

Please circle your rating for each of the following questions or statements.

- | | | |
|--|-----|----|
| 1. Do you teach junior high school? | Yes | No |
| If not, what level _____? | | |
| 2. Do you teach industrial arts? | Yes | No |
| If not, what subject _____? | | |
| 3. Did you use these materials in your program? | Yes | No |
| 4. Do you plan to use them in the future? | Yes | No |
| 5. Did these units add content you would not have covered? | Yes | No |

- | | Strongly
Disagree | Disagree | Agree | Strongly
Agree |
|---|----------------------|----------|-------|-------------------|
| 6. The topics were appropriate for use in your classes. | 1 | 2 | 3 | 4 |
| 7. The content was appropriate for class use. | 1 | 2 | 3 | 4 |
| 8. The bilingual format was helpful for some students. | 1 | 2 | 3 | 4 |
| 9. The reading level was appropriate. | 1 | 2 | 3 | 4 |
| 10. The modules were appropriate for individual instruction. | 1 | 2 | 3 | 4 |
| 11. The modules were appropriate for class or group use. | 1 | 2 | 3 | 4 |
| 12. The modules identified content which is not normally covered. | 1 | 2 | 3 | 4 |
| 13. The students reacted favorably. | 1 | 2 | 3 | 4 |
| 14. The use of the modules resulted in class improvement. | 1 | 2 | 3 | 4 |
| 15. Other Comments: | | | | |

APPENDIX C

RESPONDENTS' COMMENTS
FROM INITIAL EVALUATION

RESPONDENTS' COMMENTS FROM THE INITIAL EVALUATION

- Very good - I will most definitely use the material.
- Need more information; too shallow.
- Do think the units would be of value to me and my students-new and catch-up work.
- We were not given proper time to evaluate the instruments.
- These units would help me enormously with some of my handicapped students who cannot keep up with regular notetaking for reasons such as hearing loss or inability to write well. The illustrations are so important as the text for these students. It is hard to lip read the word hacksaw when it is so foreign to you. But to see the picture, read the content in conjunction to seeing the teacher say it. Great thanks to you.
- These modules could be used to help a students better understand some basic information.
- Very well done-this type appeals to the student I work with.
- Repeating is a must, also diagrams.
- I will take some of your information and use in my demonstrations.
- Students generally come to IA classes to work-build things-Not very interested in other activities even though they may be very important.
- The reason I checked students reaction (question 6) so low, is because I have found that when you say "read" to a shop student, it almost automatically turns them off.
- Reading level directs this to a middle school rather than high school I would like this program to be in every school.
- This unit would benefit my students in the first part of the semester.
- I think this would be a good study or part time review.
- C.E is most important to IA but can be very time consuming without a format.
- Very good information bilingual
- I would love to see more material along these lines.
- I believe they will be very useful - gonna try anyway
- It could be used well as supplimentary material
- I will need to try this
- Will have to wait and see the outcome
- Most Spanish students would not be able to read.
- Workshop was very informative.
- Very good module handouts
- Handout done very well.
- A very good series. I will attempt to incorporate into some of my instructions.
- The speaker made a good and effective effort to relate to the different vocational areas present.
- Good presentation
- Subject I reach: Metals - H.S.
- Problem solving steps will be eased in making dittoes for serving samples of methods.
- If the module was related to Home Economics, I'm sure I would use it in my class as an individualized program or to catch students up on work missed or for students who enter the school after the semester begins. In fact, we hand our new students a packet to acquaint them with our dept. same idea, different format.
- I teach introduction to careers.
- I think this is an interesting concept but it would take quite a bit of revision to use in Coop.

- Would like to have class copies with worksheets separate.
- Develop a teacher guide to implement information contained in modules.
- Good fill in material for in-between subject changes
- Would like to see one of these programs in general crafts, covering leather work, ceramics, graphic arts.
- Very interesting, well organized
- I teach drafting and do not speak Spanish, even though the contents are good, I have no use for them.
- Due to large Mexican-American enrollment this would be a very useful tool.
- Do one on Drafting (Mechanical)
- I believe a different lay out is needed (all english or all spanish, folded in half 4 1/4 X 5 1/2 booklets.
- This is one area I have not covered in the past but I can use it now.
- Because of an increase of none English speaking students I have really needed something of this nature.
- As mentioned, the reading level is a bit low.
- Materials in the units have very little to do with my subjects and programs.
- If used in an individualized instruction manner, I would find them useful.
To be used as a fill in for a lab or something else to do is a big hazzard of this module.
- The spanish being used is of a 10th or twelveth level which could be very difficult to use in some circumstances in middle school.
- I feel that this approach will make IA more meaningful for students in the future.
- I am drafting only.
- Would like to see a reproducible master.
- I work with multihandicapped special education children and would need to lower the levels to approximately first grade level, otherwise, I believe the modules are very good.
- We really do need some teaching method developed by Texas teachers
- Units on safety, woodworking machine, table saw, etc.
- More specific, more refined units would be better-Units regarding specific woodwork tools and machines (e.g. Routers, Drill press, table saw, jointer, etc.).
- I would like to be given more information on how to teach the content as I'm supposed to.
- The unit should be in English only, some sections do not have enough information; High reading level.
- 3 was rated because some are good, some are not.
- We plan to look this over for a special education woodshop program.
- The booklet indicates interest and good work on behalf of the developers.
- This is good for lower grades but not the high school level.
- Would like to see similar modules done with shop, math, drafting, arts and crafts.
- I would like to see unit in drafting
- Very interesting and thought provoking.
- A very good program.
- A could make good use of a module on drafting tools.
- I would like to see consumer modules for middle school
- Very good
- I feel that the module is invaluable however this is not a very detailed type of module.
- I'd like to see topics for high school areas.
- I would like these modules design for grades other than 7th thru 8th grades such as higher grades

- Need to be expanded to cover more topics in more areas.
- This module will establish a better means for students to react to being a consumer in our society, for example, buying different types of items for their own use.

APPENDIX D

RESPONDENTS' COMMENTS FROM
THE FOLLOW-UP EVALUATION



APPENDIX D

RESPONDENTS' COMMENTS FROM THE FOLLOW-UP EVALUATION

1. I teach drafting, so when I skimmed over the materials I didn't recognize any material that would be applicable.
2. Outstanding material for use by substitute. I need them on 3 occasions (preplanned) briefing the students beforehand on their tasks and leaving workbooks, quizzes, etc. for the sub. I had the students use a Scantron Form to take the quizzes and I scored them the next day. Instead of a "nothing" day the students received meaningful work and enjoyed the work also.
3. I really feel you have done a good job that should help public school teachers.
4. They are in too simple form.
5. Content would have needed to be changed so much for use in any of my classes. I did have a class that a bilingual format would have helped in but the second language was Taiwanese.
6. Will continue to use this material.
7. Students want to work. No book work!!!
8. Most of my high school students wanted to know why they had to do the modules. Their general reaction was "How come we have to do this stuff" It did improve test scores where retest over the material was given.
9. They helped save my program because I was put in a situation with a new school and no equipment was there. Thank you very much.
10. Separation (of the English and Spanish text ??) should be made. In the Mexican community it would do well - but in a normal class NO - it confused my students to the point that I stopped using the idea. I don't have the funds to make a complete (English only?) copy. This is what I will do in the future when money is available.
11. At this time the units I am teaching include only a small part of these modules.

APPENDIX E
COMPOSITE LIST OF METHODS OF USE

APPENDIX E

Composite List of Methods of Use

1. pre-post test
2. mini lessons for self study
3. preparation for problem-solving activities that involve searches in retail stores
4. homework
5. detention hall work
6. preparation for team projects on savings
7. checking level tests
8. energy activities and home check reports
9. supplement guest speakers on fire safety
10. preparation for research projects
11. learning tool and equipment names
12. lesson plan guides
13. resource & reference center material
14. media masters
15. reading references and reinforcement
16. review materials
17. work for substitute teachers to use
18. reinforcement for regular topics and safety
19. preparation and motivation for guests speaker
20. oral reading lessons
21. testing and evaluation
22. lecture guides for students to follow
23. orient new students
24. introduction to topics
25. aid to building bilingual vocabulary
26. lessons for students who speak no English
27. supplemental study guides for regular topics
28. "filler" lessons for short periods or slack time between projects.
29. reference for questions concerning equipping a home workshop
30. demonstration tests
31. final exam content
32. introduction materials for students entering program late in a term
33. material for special needs students
34. language program supplements
35. individualized instruction
36. adult evening education references
37. pair Spanish and English speaking students together for language and cultural sharing experiences

APPENDIX F
NEW MODULES

El Departamento de Educacion Industrial
de Texas A&M
presenta otro topico en la

SERIE PARA COMPRAR INTELIGENTEMENTE

COMO COMPRAR CARROS O CAMIONES DE CARGA USADOS

**FOLLETO DE INFORMACION
sobre**

INSTRUCCIONES: Lea el Contenido de Este Folleto y Use
la Informacion Para Completar Las Hojas de Tarea
Para Este Modulo. Por Favor no Escriba en Este
Folleto.

Developed by a grant from the HCLC of the Texas Education Agency.

The Industrial Education Department
of Texas A&M
presents another topic in the

SMART BUYING SERIES

BUYING USED CARS OR TRUCKS

Objectives:

How to select and buy used vehicles.

**INFORMATION BOOKLET
about USED CARS
USED TRUCKS**

INSTRUCTIONS: Read the material in this booklet and
use the information to fill out the worksheets
for this module. Please *do not* write in
this booklet.

Developed by a grant from the HCLC of the Texas Education Agency.

¿Que es un carro o un camion de carga usado?



Tanto un carro como un camión de carga usado es un vehículo que ha pertenecido a uno o mas individuos o compañías. Un carro usado puede haber sido propiedad de alguien por unos pocos días como también por muchos años. Puede haber sido manejado muchas millas o muy pocas. Estos vehículos se pueden conseguir en estilos y tamaños muy diferentes y variados.

WHAT IS A USED CAR OR TRUCK?



A used car or truck is a vehicle that has been owned by one or more individuals or companies. Used cars may have been previously owned for a few days or many years. Used vehicles may have been well cared for or neglected. Used vehicles may have high milage or low milage. Used vehicles are available in all sizes and shapes.

¿Donde se venden los carros usados?

Se pueden conseguir en una agencia dedicada a la venta de automoviles (donde también se venden carros nuevos), en negocios dedicados exclusivamente a la venta de carros usados, como también de personas particulares o de compañías en general no dedicadas al negocio de carros usados.



52

WHERE ARE USED CARS SOLD?

Used cars are sold at dealerships (also sell new cars), used car lots, and from individuals or companies (not in the used car business).



53



¿Hay ventajas y desventajas en
comprar un carro usado en estos lugares?

Es ventajoso comprar un carro usado en una agencia porque generalmente son quienes proporcionan mejor garantía por sus carros usados. Sin embargo, las agencias tienen también con frecuencia carros más nuevos y piden un precio más alto por ellos. Por otro lado, están capacitados para proporcionar servicio y piezas de repuesto en el mismo establecimiento.

Los negocios de carros usados, por otra parte, no siempre pueden proporcionar una buena garantía y/o servicio de mantenimiento. La calidad de los vehículos que se venden en los negocios de carros usados suele ser también inferior a la de aquellos que se pueden conseguir en la agencia.

Cuando se compra un carro usado a un particular o a una compañía, no cuenta uno con garantía ni mantenimiento. Los precios en estos casos pueden variar enormemente. Es posible obtener un buen precio de una persona particular o de una compañía porque no tienen los gastos de ventas que tienen las agencias especializadas.

¿Qué se debe hacer cuando se ha decidido comprar un carro usado?

Una vez que haya tomado la decisión, el siguiente paso consistirá en hacer una lista de requisitos. A continuación tenemos algunas de las preguntas que debemos hacernos en estos casos:

1. ¿Se usará este vehículo para viajes cortos, largos, o para ambos tipos de viaje?
2. ¿Se utilizará regularmente este vehículo para llevar objetos pesados o voluminosos?
3. ¿Cuántos adultos deberá transportar regularmente el vehículo?
4. ¿Es muy importante economizar en gasolina?
5. ¿Puede usted encargarse del mantenimiento del coche personalmente?



ARE THERE ADVANTAGES AND
DISADVANTAGES TO THESE SOURCES?

Yes, the dealership generally provides a better guarantee on their used cars. Dealerships, however, frequently have newer cars and ask a higher price for them, but service and parts are available on the site.

The used car lot, on the other hand, may not provide a good guarantee and/or have maintenance available. The quality of the used cars sold at car lots may be lower than the used cars found at a dealership.

When one purchases a used car from an individual or company, there is no guarantee or maintenance available. The prices when dealing with this source, vary widely. It is possible to get a good deal from an individual or company, because there are no sales expenses that dealers have.

ONCE YOU HAVE DECIDED TO BUY A USED CAR, WHAT SHOULD YOU DO?

Once the decision to buy has been made, the next step is to generate a list of requirements. You may wish to ask the following questions:

1. Is this vehicle for short-distance traveling, long-distance traveling, or both?
2. Will this vehicle be regularly used to carry heavy or bulky objects?
3. How many adults will the vehicle need to carry?
4. Is gas mileage a major concern?
5. Can you do your own maintenance?



Si el vehículo está destinado principalmente para ir y venir del trabajo y es necesario acomodar a cuatro adultos, podremos eliminar inmediatamente los carros deportivos y de tipo "pick-up". Si lo que le preocupa es economizar en gasolina reduciremos aún más la lista de posibilidades e incluiremos solamente carros de tamaño mediano con motores pequeños. Si es que usted tiene la habilidad de hacer sus propias reparaciones, un carro usado puede ser una ventaja.



Una vez que tenga una idea de lo que quiere ¿que debe hacer?



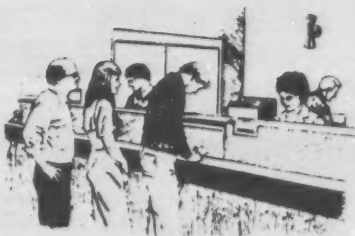
El siguiente paso será determinar con cuánto dinero cuenta para la compra del carro. El dinero proviene generalmente de alguno de los siguientes medios:

1. Ahorros
2. El valor de canje de un carro viejo (si lo tiene)
3. Préstamos

Lo más sencillo es hacer un total de todos sus ahorros. Puede sumar el valor de los bonos que posea, agregar los totales de sus cuentas de ahorros y también cualquier otro dinero de que disponga, y así tendrá el total de todos sus ahorros.

Si tiene un carro para canjear, podrá obtener su valor consultando los precios establecidos por las compañías de seguros ("blue book"), bancos, mecánicos, y averiguando los precios de carros comparables que estén en venta.

El tercer medio, préstamos, es a veces un poco difícil de lograr para la persona que por primera vez compra un carro. La idea de hacer un contrato por el cual se compromete a pagar una cantidad X de dólares al mes durante varios años es bastante para hacer pensar seriamente a cualquiera. El hecho es que quien pide prestado por primera vez está generalmente tan contento de encontrar una institución que acepte darle el préstamo, que no sigue buscando.



If commuting to and from work will be the main use of a vehicle and the ability to carry four adults is a necessity, pick-ups and sports cars can be eliminated immediately. A concern for gas mileage may further reduce the list of possible choices to include only medium sized cars with small engines. If you can do your own repairs, a used car may be an advantage.



ONCE YOU HAVE DETERMINED THE TYPE OF VEHICLE YOU NEED, WHAT NEXT?



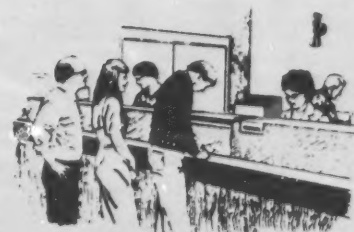
The next step is to determine how much money is available to purchase the car. The money comes from three general sources:

1. Savings
2. Trade-in value of old car (if you have one)
3. Borrowing

The totalling of all savings is the easiest task. You can add up savings bonds owned, obtain totals for passbook savings accounts, and for money from other sources to get a total of all savings.

If you have a trade-in car, an estimate should be obtained from several sources such as "blue book" values from insurance companies, banks, mechanics, and pricing comparable cars that are "for sale."

The third source, borrowing, is sometimes a frightening undertaking, for the "first-time" car buyer. The thought of entering into an agreement where you agree to pay X number of dollars per month for several years is sobering. In fact, the "first-time" borrower may be so happy to find an institution that will agree to lend the money, that he or she will look no further.



El dejar de averiguar cuál es la institución que presta con menor interés es un error que hacen muchos compradores de carros. Diferentes instituciones de la misma comunidad suelen ofrecer préstamos que difieren mucho en cuanto a intereses. Encontrar un préstamo con un interés bajo le ahorrará años o tal vez muchos dólares mensuales dependiendo el monto del dinero prestado.



¿Qué instituciones prestan dinero para comprar carros?

Hay muchas instituciones que prestan dinero a las personas que tienen el propósito de comprar carros. Estas incluyen:

- 1.) Cooperativas de crédito (credit unions)
- 2.) Compañías de seguros - (algunas prestan dinero sobre el valor en efectivo de la póliza)
- 3.) Bancos de servicio completo
- 4.) Asociaciones de Ahorros y Préstamos
- 5.) Corporaciones Financieras Particulares

Tradicionalmente, las instituciones que prestan a más bajo interés han sido las cooperativas de crédito y las compañías de seguros. La desventaja de ambas como fuentes de préstamos estriba en que no están al alcance de todos. A fin de poder pedir prestado en una cooperativa de crédito usted deberá ser empleado de la compañía o pertenecer a una organización que emplee o tenga como miembro una cooperativa de crédito. Los bancos de servicio completo, las Asociaciones de Ahorros y Préstamos, y las Corporaciones Financieras particulares prestan dinero a todos. Los intereses son sin embargo, más altos en estas instituciones.



The failure to shop around to find the institution that has the lowest interest rate is a mistake made by many car buyers. There will be a fairly large difference in interest rates between different institutions in the same community. Finding the lowest rate will save you from several to many dollars per month depending on the amount of money borrowed.



WHICH INSTITUTIONS LEND MONEY TO PURCHASE CARS?

There are many institutions which lend money to individuals for the purpose of purchasing cars. They include:

- 1.) Credit unions
- 2.) Insurance companies - (some will lend money on the cash value of policy)
- 3.) Full service banks
- 4.) Private Finance Association
- 5.) Private Finance Corporations

Traditionally, the institutions with the lowest interest rates have been credit unions and insurance companies. The drawbacks to these two sources of loans is that

they are not available to everyone. In order to borrow from a Credit Union you must be employed by a company or belong to an organization which has an employee or member Credit Union. Full service banks, Savings and Loan Associations, and Private Finance Corporations will lend money to anyone. The interest rates, however, are often higher for these institutions.



¿Y Luego?

Una vez determinadas sus necesidades por medio de las dos listas como también el dinero disponible, investigue todas las posibilidades de adquirir carros usados. Visite agencias, negocios de carros usados, y además personas particulares y compañías que tengan carros en venta. Identifique y calcule el valor de los carros que llenen sus requisitos y que estén de acuerdo a sus posibilidades económicas.

Si encuentra alguno que le guste, manéjelo para probarlo y haga que un mecánico particular se lo revise. Una vez que haya pasado la prueba del manejo y el mecánico, trate de conseguir el mejor precio posible con el vendedor ofreciéndole de 10% a 15% menos del precio cotizado y recapacite sobre la compra por lo menos durante la noche antes de tomar una decisión final.



Algunos detalles que el típico comprador de carros debe considerar.

La siguiente lista no le asegurará que el carro que va a comprar no tiene ningún problema, pero usando esta lista y haciendo que un mecánico revise el carro sus probabilidades de hacer una buena compra mejorarán visiblemente. Deberá observar con cuidado lo siguiente:

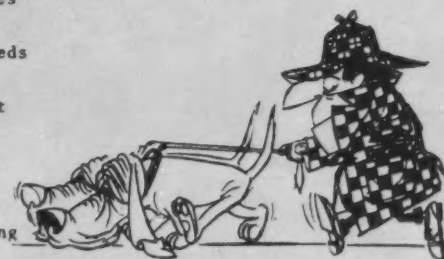
1. Millaje - un millaje alto significa con frecuencia mayor gasto en mantenimiento.
2. Ruidos - observe si el carro hace ruidos inapropiados cuando realice su manejo de prueba.
3. Condición de las llantas - observe si están gastadas de manera desigual y determine la probable duración de las llantas.
4. Escapes - revise debajo del vehículo en busca de posibles escapes de aceite y de la transmisión.
5. Compartimiento del Motor - revise la batería, mangueras, y apariencia general.
6. Carrocería e interior - revise la pintura, molduras y condición del interior del carro.



WHAT NEXT?

Once your needs are determined and your available money is determined, check all available sources of used cars. Visit dealerships, used car lots, and individuals or companies with cars for sale.

Identify and price the cars that suit your needs and pocketbook. If you find one that you would like to buy, test drive it and have an independent mechanic look it over. Once it passes the driving and mechanics test, work out the best deal with the salesman by offering 10%-15% percent less than the price listed and think about the purchase at least overnight before making a final decision.



ARE THERE ANY ITEMS THAT THE TYPICAL CAR BUYER CAN CHECK?

Yes, the following checklist will not assure that the car you buy is "problem free", but using the checklist and having a mechanic look over the car will improve your chances of making a good deal. You should look at the following:

1. Milage - high milage in many cases means more maintenance.
2. Noises (rattles & squeaks) - check for these during your test drive.
3. Tire Condition - check for uneven wear and determine remaining tire life.
4. Leaks - check under the vehicle for oil and transmission leaks.
5. Engine Compartment - check the battery, hoses, and general appearance.
6. Body & Interior - check paint job, molding and condition of interior.



7. Aceite - revise el aceite en cuanto a nivel y condición.
8. Equipo opcional y Accesorios - chequee para ver si funcionan.
9. Desgaste del freno y del acelerador - frenos y aceleradores gastados significan manejo interrumpido por frecuentes paradas y aceleraciones.



7. Oil - check oil for level and condition
8. Options and Accessories - check to see if they work.
9. Brake and Gas Pedal Wear - worn brake and gas pedals mean lots of stop and go driving.



The Industrial Education Department
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SMART BUYING SERIES

BUYING USED CARS OR TRUCKS

STUDENT WORKSHEETS

INSTRUCTIONS: Fill out these worksheets after reading through the information booklet. If necessary, use the booklet to find the answers. Later you may be given a quiz on this information.

Developed by a grant from the R.C.U. of the Texas Education Agency.

WORKSHEET

1. List three different sources where used cars may be purchased.
 - a. _____
 - b. _____
 - c. _____
2. The _____ generally provides the best guarantee for its used cars.
3. Once you have decided to purchase a used car, the next step is to generate a list of _____.
4. List three requirements that may be specified by a person planning to buy a used car.
 - a. _____
 - b. _____
 - c. _____
5. List three sources of funds that are frequently used to purchase used cars.
 - a. _____
 - b. _____
 - c. _____
6. Which lending institution will probably have the lowest interest rate?
7. It is advisable to have an independent _____ check over any used car before agreeing to purchase it.
8. What can be accomplished during the test drive?
9. Will the use of a checklist to when buying a used vehicle assure that the vehicle will be "trouble free."

10. List nine items that you can check that will improve your chances of making a good deal.

- | | |
|----------|----------|
| a. _____ | f. _____ |
| b. _____ | g. _____ |
| c. _____ | h. _____ |
| d. _____ | i. _____ |
| e. _____ | |

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BUYING USED CARS OR TRUCKS

STUDENT QUIZ

Developed by a grant from the RCU of the Texas Education Agency.

QUIZ

Write in T for True or F for False for each question.

- _____ 1. Used vehicles are available in varying conditions and sizes.
- _____ 2. You should avoid purchasing cars from individuals since it is impossible to get a good deal.
- _____ 3. Dealerships provide the best guarantee on used cars.
- _____ 4. Individuals and companies will provide excellent guarantees and maintenance on the cars they sell.
- _____ 5. If you can repair your own vehicles, it is best to avoid purchasing used vehicles.
- _____ 6. The generation of a list of vehicle requirements is advisable for anyone planning to purchase a used vehicle.
- _____ 7. Three general sources of money for purchasing used cars are savings, trade-in value of an old car, and borrowing.
- _____ 8. Avoid using an independent mechanic to check out a used vehicle before you purchase the vehicle.
- _____ 9. Check lists are useful, but they will not guarantee that the car you buy will be trouble-free.
- _____ 10. Test driving a used vehicle is a necessity.

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SMART BUYING SERIES

BUYING CLEAR WOOD FINISHES

Objectives:

How to select and buy clear wood finishes.

INFORMATION BOOKLET about

- SHELLACS**
- VARNISHES**
- LACQUERS**
- OILS**

INSTRUCTIONS: Read the material in this booklet and use the information to fill out the worksheets for this module. Please *do not* write in this booklet.

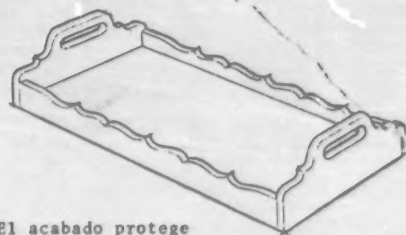
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¿Por qué usar un acabado transparente en la madera?

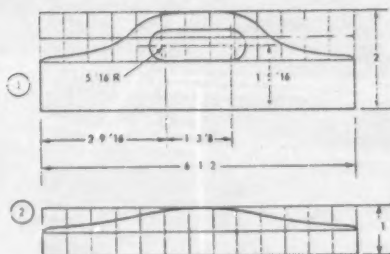
Un acabado transparente protege la madera destacando al mismo tiempo su belleza.



El acabado protege también la madera contra los efectos del clima, humedad, vapores, líquidos, y rasguños.



Es importante que un acabado transparente sea capaz de mostrar y aún de destacar la belleza de la madera, especialmente en el caso de las maderas finas como lo son el nogal, el encino, la madera de cerezo, etc.



¿Que es un acabado transparente?

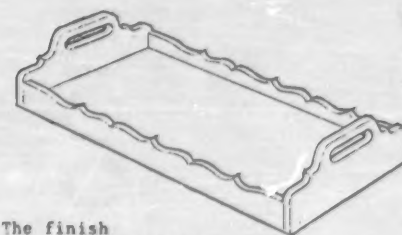
Un acabado transparente es una capa que protege la madera y mejora su apariencia. Esta capa puede ser aplicada con una brocha, con pulverizador, o frotándola con un trapo. Se aplica en forma de líquido y se endurece, formando una superficie resistente a raspaduras en la madera.

WHY USE A CLEAR FINISH ON WOOD?

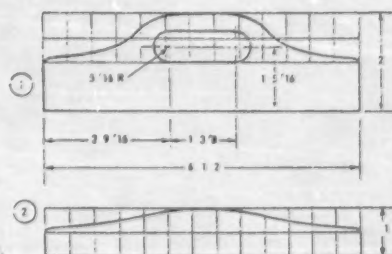
A clear finish protects the wood while allowing the beauty of the wood to be seen.



The finish protects the wood from being damaged by weather, humidity, fumes, liquids, and scratches.



The ability of a clear finish to show and even improve the beauty of the wood is especially important with fine quality woods such as walnut, mahogany, oak, cherry, etc.



WHAT IS A CLEAR FINISH?

A clear finish is a coating which protects the wood and improves its appearance. The coating can be applied by brushing, spraying, or wiping with a rag. This coating is applied as a liquid and hardens to form an abrasion resistant surface on the wood.

¿Hay diferentes tipos de acabados transparentes para maderas?

Hay muchos tipos de acabados transparentes para maderas. Los más importantes son los barnices, el barniz de tipo "shellac", las lacas, y los barnices al aceite.

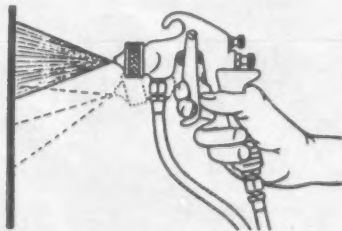


Los barnices se aplican con una brocha y la técnica de esta aplicación requiere práctica. Los barnices cuando están correctamente aplicados proporcionan excelente protección para la madera.

El barniz de tipo "shellac", un tipo de laca, se aplica también con brocha, pero se seca más rápidamente que los barnices como también ofrece menor protección que éstos.



Las lacas se aplican generalmente con pulverizador, pero la mayoría de las lacas modernas se pueden aplicar también con brocha. La protección que proporcionan las lacas es igual a la de los barnices.



ARE THERE DIFFERENT TYPES OF CLEAR WOOD FINISHES?

There are many types of clear wood finishes available. The major groups include varnishes, shellacs, lacquers, and penetrating oils.

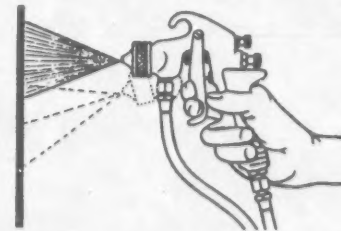


Varnishes are applied with a brush and this application technique requires practice. Varnishes, when correctly applied provide excellent protection for wood.

Shellacs are brushed on also, but the drying time is shorter than varnishes. Shellacs offer less protection than varnishes.



Lacquers are frequently applied by spraying, but brush application is acceptable for more modern lacquers. The protection provided by lacquers is equal to that of varnishes.





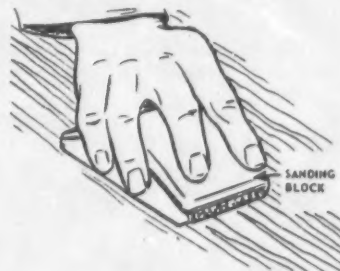
Los barnices al aceite pueden ser aplicados fácilmente con un trapo o combinación de brocha y trapo. Estos aceites no dejan un depósito en la superficie de la madera como en el caso del "shellac" y las lacas. Los aceites penetran y sellan la superficie de la madera. La protección que ofrecen estos barnices al aceite no es tan efectiva como la de los barnices o las lacas, pero el acabado al aceite (o al óleo) dura más.

Los acabados transparentes se pueden conseguir también para interiores y exteriores. Cuando escoja un acabado transparente para ser usado en los muebles de madera del jardín, esté seguro de que es del tipo que puede usarse en áreas exteriores.

¿Hay algunas reglas que seguirse cuando se aplican los acabados transparentes?

Si usted no aplica un acabado correctamente, puede abrirse o pelarse. Cuando esto sucede, se pierde la protección y además tiempo y dinero. Para mejores resultados, prepare la superficie de la madera antes de aplicar el acabado. Como regla general, la superficie deberá ser:

1. Bien lijada (comience con papel de lija N° 120 y, termine con el N° 220 o 280.



2. Limpie y libre de partículas sueltas (cepille y limpie con un trapo limpio)



Penetrating oils can be easily applied with a rag or brush and rag combination. These oils do not leave a deposit on the surface of the wood like varnishes, shellacs, and lacquers. They penetrate and seal the surface of the wood. The protection provided by penetrating oils is not as good as varnishes or shellacs, but the oil finish lasts longer.

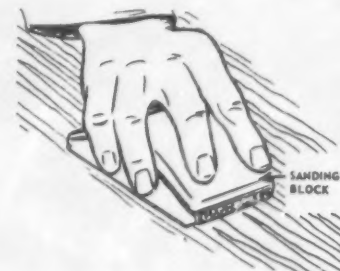
Clear finishes are also available in interior or exterior types. When choosing a clear finish for use on outdoor wood furniture, make certain it is an exterior type.

ARE THERE ANY GENERAL RULES TO FOLLOW WHEN APPLYING CLEAR FINISHES?

If you do not apply a finish correctly, it may crack or peel. If it does, the protection is lost and your time and money are wasted. For best results, you should prepare the wood surface before you apply the finish.

As a rule, the surface should be:

1. Well-sanded (begin with 120 grit paper and end with 220 or 280 grit paper)



2. Cleaned to remove loose particles (brush and wipe with a clear rag)

Para aplicar el acabado en la madera usted necesitará una brocha de buena calidad en el caso de barnices, acabados de "shellac", y ciertas lacas, o de lo contrario, un trapo limpio y libre de pliegues para los barnices al aceite. A continuación damos las reglas generales para la aplicación de los acabados transparentes:

1. Aplique el acabado en un lugar libre de polvo para evitar manchas en la superficie del acabado.
2. Trabaje en lugares bien ventilados para evitar la inhalación de vapores dañinos.
3. Use trapos y brochas bien limpios para evitar trabajos desiguales y de mala calidad.
4. Siga las instrucciones del fabricante para el uso del producto.
5. Evite usar productos caros para trabajos de acabado temporales.
6. Use un producto de buena calidad vendido por un fabricante de buena reputación para trabajos de acabado permanentes.
7. La brocha es muy importante y su calidad debe ser tan buena como el tipo de acabado que se aplica. Algunos tipos de cerdas no dan buenos resultados cuando se usan en combinación con ciertos tipos de acabado. Para mejores resultados estudie las instrucciones y use una brocha de calidad con el tipo de cerda apropiado.



To put a finish on wood you will need a quality brush for varnishes, shellacs, and some lacquers or a clean linefree rag for penetrating oils. General rules for applying clear finishes include:

1. Apply the finish in a dust-free area to prevent spots in the surface of the finish.
2. Work in a well ventilated area to avoid dangerous fumes.
3. Use clean rags and brushes to prevent uneven and poor quality jobs.
4. Follow the directions provided by the manufacturer.
5. Avoid using expensive finishes for temporary wood finishing jobs.
6. Use a quality finish sold by a reputable manufacturer for permanent finishing jobs.
7. The brush you use is important. The quality should be as good as the type of finish you apply. Also, some types of bristles do not give good results when used with some types of finishes. For best results, check these factors and use a brush of appropriate quality and bristle type.



¿Dónde se compran los diferentes barnices o acabados transparentes?

Los acabados transparentes se pueden comprar en los grandes almacenes (department stores), almacenes de madera, ferreterías, y tiendas de pintura. Las tiendas de pintura y las ferreterías son los establecimientos que cuentan con la mejor selección y con la gente mejor preparada para ayudarle. Si usted no ha comprado nunca un acabado transparente, puede visitar varios lugares donde se vendan para obtener información sobre las muchas posibilidades y una vez que haya identificado el acabado que necesita, puede buscar quien le ofrezca el mejor precio.



WHERE ARE CLEAR FINISHES PURCHASED?

Clear finishes may be purchased at department stores, lumber yards, hardware, and paint stores. Paint stores and hardware will have the best selection and the most knowledgeable sales people. If you have never purchased a clear finish, you could visit several places where clear finishes are sold to get information on available finishes. Once you have identified the finish needed, you can shop around for the best price.



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SMART BUYING SERIES

BUYING CLEAR WOOD FINISHES

STUDENT WORKSHEETS

INSTRUCTIONS: Fill out these worksheets after reading through the information booklet. If necessary, use the booklet to find the answers. Later you may be given a quiz on this information.

WORKSHEET

1. Why would you use a clear finish on wood?
2. How are clear finishes applied?
3. List the two clear finishes that provide the best protection?
a. _____ b. _____
5. What are the two major surface preparation steps?
a. _____ b. _____
6. Why should you carefully follow the directions when applying clear finishes?
7. Which businesses will have the best clear finish selection and most knowledgeable sales persons?
8. Why should you work in a well-ventilated area when applying clear finishes?
9. Why is the type of brush important when applying clear finishes?
10. If you have never purchased a clear finish, what procedure should you follow?

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BUYING CLEAR WOOD FINISHES

STUDENT QUIZ

Developed by a grant from the RCU of the Texas Education Agency

QUIZ

Write in T for True and F for False for each question.

- _____ 1. A clear finish provides protection without harming the natural beauty of the wood.
- _____ 2. Penetrating oil finishes provide the best protection for wood.
- _____ 3. Varnishes are applied with a clean lint-free rag.
- _____ 4. If you have never purchased a clear finish, it would be advisable to visit several places where clear finishes are sold to get information on available finishes.
- _____ 5. Department stores will have the best selection of clear finishes and the most knowledgeable sales people.
- _____ 6. When using varnish, shellac, or some lacquers, it is important to use the proper brush.
- _____ 7. Since clear finishes are not available for exterior use, you should not use a clear finish on lawn furniture.
- _____ 8. Sanding and cleaning to remove loose particles are the two major surface preparation steps that should be performed before applying a clear finish.
- _____ 9. When applying clear finishes, you should work in a well ventilated area.
- _____ 10. A clear finish is not recommended for fine quality woods such as walnut, mahogany, oak, and cherry.

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SERIE PARA COMPRAR INTELIGENTEMENTE

COMO COMPRAR TORNILLOS

**FOLLETO DE INFORMACION
sobre**

INSTRUCCIONES: Lea el Contenido de Este Folleto y Use la Informacion Para Completar Las Hojas de Tarea Para Este Modulo. Por Favor no Escriba en Este Folleto.

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SMART BUYING SERIES

BUYING WOOD SCREWS

Objectives:

How to select and buy wood screws.

**INFORMATION BOOKLET
about**

**FLAT HEAD SCREWS
ROUND HEAD SCREWS
PLATED SCREWS
BRASS SCREWS**

INSTRUCTIONS: Read the material in this booklet and use the information to fill out the worksheets for this module. Please *do not* write in this booklet.

Developed by a grant from the R.C.U. of the Texas Education Agency.

¿CUÁNDO SE DEBEN USAR TORNILLOS PARA CLAVAR LA MADERA?

Se usan tornillos en la fabricación y reparación de muebles y también en ciertos trabajos de construcción de edificios. Se usan, por ejemplo, para pegar las patas de la mesa, los asientos en las sillas, las bisagras en las puertas, y las cerraduras de puertas y ventanas.

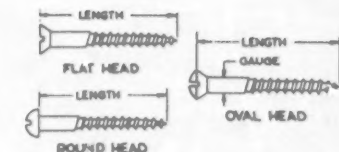


¿Cuáles son las ventajas y desventajas de usar tornillos para unir la madera?

Los tornillos tienen dos ventajas si se les compara a otros medios para unir la madera. La primera está en que los tornillos tienen mayor poder de retención que otros métodos para unir madera y la segunda en que permiten desarmar el proyecto con mayor facilidad que otros medios.

¿Hay muchos tipos de tornillos disponibles?

Los hay, los tornillos para madera se pueden clasificar tomando en cuenta la forma de la cabeza, la longitud, el diámetro, y el tipo de metal. Las cabezas de los tornillos para madera pueden ser redondas, ovaladas y planas. Además, las cabezas de los tornillos pueden ser acanaladas o de tipo "phillips". La longitud "standard" de los tornillos varía entre 1/4" y 6" y los diámetros de los tornillos varían desde el número 0 hasta



el número 24. Cuanto mayor es este número mayor será la circunferencia del tornillo. La mayor parte de los tornillos son de acero recubiertos con un metal resistente a la oxidación y tornillos de latón sólido para ser usados en lugares húmedos.

WHEN ARE SCREWS USED TO FASTEN WOOD?

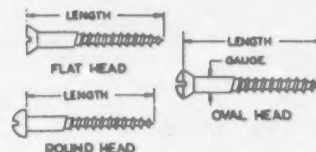
Screws are used in furniture manufacturing and repair and they are also used in certain building construction jobs. Examples include attaching table legs, chair seats, door hinges, and window and door locks.



What are the advantages and disadvantages of using screws to fasten wood?

Screws have two advantages when compared to other wood fasteners. The first is screws provide more holding power than other types of fasteners and the second is they allow the project to be disassembled easier than with other fasteners.

Are there many types of screws available?



Yes, wood screws can be classified by shape of the head, length, diameter, and the type of metal. Wood screw head shapes include round, oval, and flat. In addition, screw heads may be of the slotted or phillips type. Standard screw lengths vary from 1/4" to 6" and screw diameters vary from number 0 to number 24. The bigger this number is, the bigger around the body of the screw is. Most screws are steel, but steel plated with rust resistant metal and solid brass screws are available for use in wet or damp places.

¿Qué herramientas se necesitan para instalar tornillos en la madera?



Para instalar tornillos en la madera se necesita un taladro manual o mecánico, un surtido de piezas para ser usadas con el taladro y un destornillador de tamaño apropiado. Se puede adquirir también un mecanismo llamado "screw mate" para evitar el tener que hacer varias perforaciones de diferentes tamaños para cada tornillo. Es muy útil si necesita instalar un gran número de tornillos del mismo tamaño.

¿Qué procedimiento debe seguirse al instalar los tornillos?

En prácticamente todos los casos es necesario hacer un agujero piloto y luego otro agujero ligeramente mayor en diámetro que el tornillo que se está usando (body clearance or shank hole) antes de introducir los tornillos en la madera. El agujero guía (pilot hole) debe tener un diámetro inferior al del tornillo y su longitud está determinada por el tipo de madera a usarse. El agujero guía debe ser ligeramente más largo en el caso de maderas duras como el roble, y más corto en el caso de maderas blandas como el pino. El segundo agujero (body clearance hole) deberá ser ligeramente mayor en diámetro que el tornillo que se está usando. A continuación damos los pasos a seguirse cuando se estén instalando los tornillos en la madera.



Etapas 1 - Decida cuáles son las piezas del taladro que deberá usar para hacer el agujero guía y el agujero de entrada (body clearance) usando un pedazo de madera inservible para hacer la prueba. (Compre la pieza llamada "screwmate" si va a instalar más de 20 tornillos del mismo tamaño).

WHAT TOOLS ARE NEEDED TO INSTALL SCREWS IN WOOD?

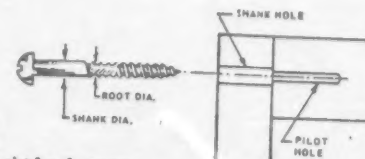


To install wood screws you need a hand or power drill, an assortment of drill bits, and the proper sized screw driver. A device called a screw mate can be purchased to eliminate the need for drilling several different size holes for each screw. It is very handy if you need to install a large number of one size screw.

What procedure must be followed when installing screws?

In practically all cases, a pilot hole and a body clearance or shank hole is smaller than the diameter of the screw and its size is determined by the type of wood being used.

The pilot hole should be slightly larger for hard woods such as oak than for soft woods such as pine. The body clearance hole needs to be slightly larger than the diameter of the screw being used. The following steps should be used when installing screws in wood.

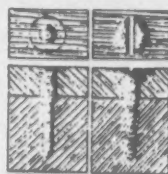


Step 1 - Determine the proper drill bits to use for the pilot and body clearance holes by trial and error using a piece of scrap wood. (Purchase a screwmate if more than 20 of the same size are being installed.)

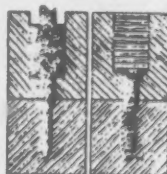
Etapas 2 - Ubique el lugar donde deberá colocar los tornillos y perfore el agujero guía a través de la pieza de madera de encima y atraviese también la segunda pieza de madera. Cuando se trate de unir maderas duras, haga el agujero guía ligeramente más largo que el tornillo y en el caso de maderas blandas, ligeramente más corto.

Etapas 3 - Para agrandar el agujero piloto coloque en el taladro la pieza de "body clearance" en la pieza de madera que va encima.

Etapas 4 - Cuando use un tornillo de cabeza plana u ovalada use la avellanadora (counter sink bit) para dar forma a la parte de encima del agujero (body clearance hole) a fin de acomodar el tornillo de manera que la cabeza no sobresalga de la superficie de la madera. (Una pieza más grande de madera puede usarse para hacer lo mismo, si es que está instalando solamente uno o cuantos tornillos planos u ovalados). Cuando use tornillos de cabeza redonda perfore un agujero más grande encima de la perforación "body clearance" a fin de que la cabeza quede bajo la superficie de la primera pieza de madera.



COUNTERSINK



COUNTERBORE

Etapas 5 - Instale el tornillo utilizando el destornillador adecuado. Cuando tenga que instalar varios tornillos en las mismas dos piezas de madera perfore los agujeros guía para los tornillos restantes en ese momento. Entonces saque el primer tornillo y siga las instrucciones de las etapas 3 a 5.

Repaso

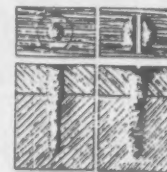
Los tornillos tienen diferentes tipos de cabezas, longitudes y diámetros, y están hechos de materiales también diferentes. Cuando compre tornillos, debe decidir cuáles son los que funcionarían mejor en su proyecto.



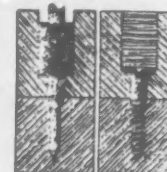
Step 2 - Locate where the screws will be placed and drill a pilot hole through the top piece of wood and into the second piece. When fastening hardwood, make the pilot hole slightly longer than the length of the screw and for soft wood make the pilot hole slightly shorter than the length of the screw.

Step 3 - Use the body clearance bit to enlarge the pilot hole in the top piece of wood.

Step 4 - When using a flat head or oval head wood screw you may want to use a counter sink bit to shape the top of the body clearance hole to accommodate the screw so the head doesn't stick up above the surface of the wood. (A larger wood bit can be used to do the same thing, if you are installing only a few flat or oval head screws) When using round head screws you may want to drill a larger hole on top of the body clearance hole (counter bore) to drop the head below the surface of the first piece of wood.



COUNTERSINK



COUNTERBORE

Step 5 - Install the screw using the proper screw driver. When installing several screws on the same two pieces of wood drill the pilot holes for the remaining screws at this time. Then remove the first screw and follow steps 3-5.

Review

Screws have different types of heads, different length, different diameters, and are made from different materials. When purchasing screws, one must decide which of the many types will do the best job.



SUGERENCIAS PARA EL CONSUMIDOR



Cuando compre tornillos para unir maderas, los mejores precios los encontrarán en las ferreterías y en los almacenes de madera. Los tornillos están empaquetados en cajas de 100 o 144 (una gruesa) y en paquetes de 6 a 12 y estos negocios tienen una buena selección y le permitirán comprar el número exacto que necesite para su proyecto. Las tiendas de variedades y de mercadería general frecuentemente venden sólo paquetes de tornillos (de un sólo tipo o un surtido de tamaños diversos) que son más caros que los de las ferreterías o almacenes de madera.

Si piensa usar tornillos de vez en cuando, será una buena idea comprar un taladro mecánico o manual barato y un juego de piezas surtidas para el taladro. Si va a usar tornillos con frecuencia será mejor comprar un juego más caro de piezas de taladro, varios "screw mates" para los tornillos usados más a menudo y un avellanador (counter sink bit).

- no compre herramientas caras que se vayan a usar muy poco.
- no compre grandes cantidades de tornillos que tal vez nunca se lleguen a usar.
- cuando compre tornillos, hágalo en negocios que ofrezcan la mejor selección a precios de competencia.
- cuando compre herramientas, busque en varias tiendas primero y considere la calidad y el precio (lea el folleto sobre cómo comprar herramientas llamado "Smart Buying Series booklet on Hand Tools").

CONSUMER TIPS



When purchasing wood screws, the best values can be found in hardware and lumber yards. Screws are packaged in boxes of 100 or 144 (one gross) and in packages of 6 to 12 and these businesses will have a good selection and allow you to purchase the exact numbers needed for your job. Variety stores and general merchandise stores frequently sell only prepackaged groups of screws (either all one type or assorted sizes) which are more expensive than the hardware or lumber yards.

If you plan to use screws occasionally, it would be wise to purchase an inexpensive hand or power drill and an inexpensive set of assorted drill bits. If you plan to use screws often, you may want to purchase a more expensive set of drill bits, several screw mates for the more commonly used screws, and a countersink bit.

- do not purchase expensive tools that will rarely be used.
- do not purchase large quantities of screws that may never be used.
- when buying screws, buy from the businesses that give you the best selection at competitive prices.
- when buying tools, shop around and consider quality and price (see Smart Buying Series booklet on Hand Tools).

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BUYING WOOD SCREWS

STUDENT WORKSHEETS

INSTRUCTIONS: Fill out these worksheets after reading through the information booklet. If necessary, use the booklet to find the answers. Later you may be given a quiz on this information.

Developed by a grant from the RCU of the Texas Education Agency

WORKSHEETS FOR SCREWS

Please fill in the missing answers.

- 1.) The two advantages of using screws over other types of wood fasteners are:
 - a) _____
 - b) _____
- 2.) The three shapes available for wood screw heads are _____ and _____.
- 3.) _____ screws and _____ screws are used in wet or damp places.
- 4.) When should screw mates be used in place of a set of assorted drill bits?
- 5.) When installing screws a _____ hole must be drilled first.
- 6.) What is the purpose of the body clearance or shank hole?
- 7.) When should you purchase expensive tools for installing screws?
- 8.) A countersink or equivalent should be used when installing _____ or _____ screws.

- 9.) Frequently screws are packaged in boxes containing _____ or _____ screws.
- 10.) When fastening hardwoods with screws, the pilot hole should be slightly _____ (larger or smaller) than soft wood pilot holes.

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BUYING WOOD SCREWS

STUDENT QUIZ

Developed by a grant from the R.C.U. of the Texas Education Agency

QUIZ

Write in T for True or F for False for each question.

- _____ 1. When installing screws, drill the body clearance hole before drilling the pilot hole.
- _____ 2. The diameters of screws are designated by numbers ranging from 0 to 24.
- _____ 3. Screws provide more holding power than other types of wood fasteners.
- _____ 4. Screwmates should be purchased and used when installing more than one or two of a particular sized screw.
- _____ 5. Hardwoods require a slightly larger pilot hole than soft woods.
- _____ 6. A counterbore is often used when installing round head screws to prevent the head from sticking up.
- _____ 7. Hardwares and lumber yards will have better selections of screws than other businesses.
- _____ 8. The consumer should buy the most expensive tools available to install screws.
- _____ 9. Brass and plated screws should be purchased if the screws will be exposed to moisture or water.
- _____ 10. A countersink or large drill bit should be used when installing flat head screws.

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COMO COMPRAR CLAVOS

**FOLLETO DE INFORMACION
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BUYING NAILS

Objectives:

How to select and buy nails

**INFORMATION BOOKLET
about**

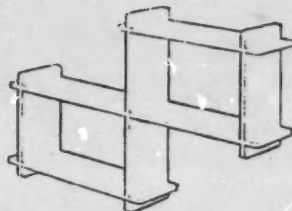
**COMMON NAILS
BOX NAILS
FINISHING NAILS
BRADS**

INSTRUCTIONS: Read the material in this booklet and
use the information to fill out the worksheets
for this module. Please *do not* write in
this booklet.

Developed by a grant from the RCU of the Texas Education Agency.

¿Para qué necesito clavos?

La mayor parte de la gente usa clavos para hacer pequeños trabajos de construcción alrededor de la casa, como por ejemplo, la instalación de un estante, la reparación de una mesa, la construcción de una cerca, la reparación de los muebles del jardín, y trabajos más complicados como la construcción de un "garage", un cuarto de herramientas, o la adición de un cuarto.



¿Qué es lo que necesito saber en cuanto a clavos?

Hay muchos tipos diferentes de clavos. Un conocimiento básico le ayudará a escoger los más apropiados para la obra en que ha de emplearlos.

Cada negocio tiene su propia manera de venderlos. Si selecciona una tienda con un método de venta adecuado a sus necesidades, usted podrá ahorrar o comprar más por su dinero.

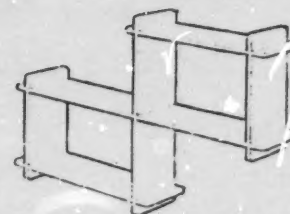
Cuándo comprar clavos

La forma más fácil de unir madera es sin duda mediante el uso de clavos. Generalmente todo lo que se necesita como herramienta para colocarlos es un martillo sacaclavos. En algunos casos, cuando deba usar tipos especiales de clavos, necesitará un fijador de clavos (nail set) y/o una palanca (nail bar).



WHY DO I NEED NAILS?

Most people use nails to repair or assemble small construction jobs around the home. Examples include: installing a shelf, repairing a table, building a fence, or repairing lawn furniture and large jobs such as building a garage, a tool shed, or the addition of a room.



WHAT DO I NEED TO KNOW ABOUT NAILS?

There are many types of nails available. A basic knowledge of them will enable you to choose the best fastener for the job on which you're working.

Selling methods differ from supplier to supplier. Selecting a supplier or store with the selling method best for you will lower your costs. You can save, or buy more for your money.

WHEN DO I BUY NAILS?

Nails are, perhaps, the easiest to use of the wood fasteners. In most cases, a claw hammer is the hand tool used to install nails. Occasionally, when nailing special types of nails you will need a nail set and/or a nail bar.



¿Qué tipos de clavos hay?

Los tipos de clavos más frecuentemente usados son el clavo común, el bellote (box), el de espiga (casing or finish nail), y las tachuelas (brads).



El clavo común se usa generalmente en trabajos de carpintería tales como la construcción de una cerca.

El clavo bellote se usa para trabajos livianos como en la construcción de cajas y cajones.



Los clavos de espiga se usan cuando no se quiere que la cabeza se vea, como en el caso de los marcos de puertas y ventanas, estantes, y otros trabajos de acabado y reparación.

La tachuela se usa para trabajos pequeños de reparación y acabado, como en casas de joyería y cajones de muebles.



WHAT TYPES OF NAILS ARE AVAILABLE?

The most frequently used nails are the common, box, casing or finish nails and brads.



The common nail is used for most carpentry jobs such as building a fence.

The box nail is used for lighter work such as building crates and boxes.

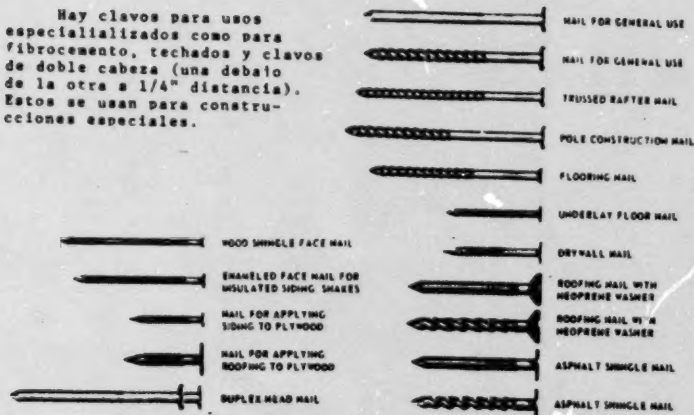


The casing and finish nails are used where you don't want the head to show, as windows and door frames, shelves, and other finish or repair work.

The brad is used for small repair and finish work, such as jewelry boxes and drawers.

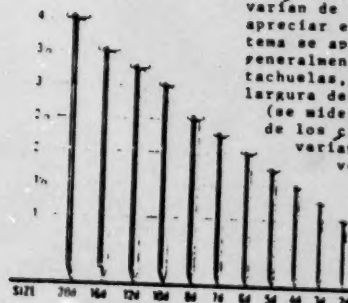


Hay clavos para usos especializados como para fibrocemento, techados y clavos de doble cabeza (una debajo de la otra a 1/4" distancia). Estos se usan para construcciones especiales.

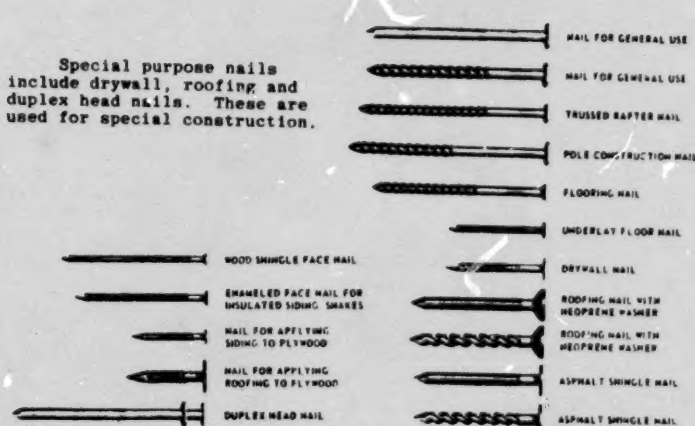


¿Que tamanos hay?

Los clavos vienen en tamaños diferentes de acuerdo a su largura. Al tamaño del clavo se le llama "penny" y se abrevia a veces usando una "d". Las medidas de los clavos varían de 2d (1") a 20d (4") como se puede apreciar en la siguiente tabla. Este sistema se aplica a todos los clavos usados generalmente excepto en el caso de las tachuelas, que se compran de acuerdo a la largura deseada (en pulgadas) y el diámetro (se mide como el alambre). Las medidas de los clavos para usos especializados varían y se debe consultar con los vendedores de materiales de construcción o de ferreterías antes de comprar clavos para usos especiales.

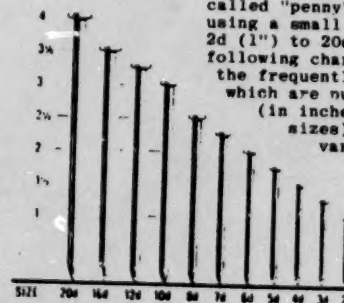


Special purpose nails include drywall, roofing and duplex head nails. These are used for special construction.



WHAT SIZES ARE AVAILABLE?

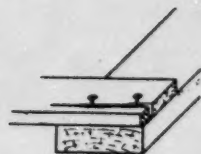
Nails come in different sizes based on how long the nails are. The nail size is called "penny" and it is sometimes abbreviated using a small "d." Nail sizes range from 2d (1") to 20d (4") as displayed on the following chart. This system applies to all the frequently used nails except brads, which are purchased by the length desired (in inches) and the diameter (in wire sizes). Special purpose nail sizes vary and building supply or hardware salespersons should be consulted before making special purpose nail purchases.



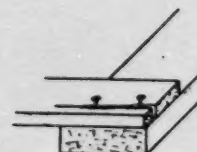
Reglas especiales que deben seguirse cuando se usan clavos para unir dos o mas piezas de madera.

Es importante seguir las siguientes reglas cuando se usan clavos:

Regla 1 - Las maderas blandas tales como el pino, el abeto o el pinabete, pueden ser clavadas con facilidad. Si es posible evite el usar clavos para unir maderas duras como el encino. Si considera que es necesario clavar maderas duras, perforo un agujero guía (de más o menos la mitad del diametro del clavo que se va a usar: a través de las dos piezas de madera primero).

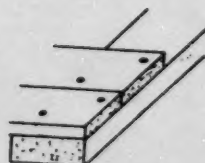


Regla 2 - Evite usar clavos muy largos o muy gruesos. Los clavos muy largos pueden ser peligrosos porque sobresalen de la madera. Los muy gruesos pueden partir la madera.

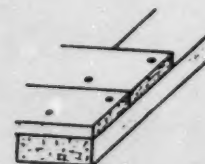


Rule 2 - Avoid using nails that are too long or too big around. Nails that are too long create a hazard because they stick out. Nails that are too big may split the wood.

Regla 3 - Cuando necesite unir dos piezas de madera de diferente grueso, siempre clave primero a través de la pieza más delgada.



Rule 3 - When fastening two pieces of wood of different thicknesses, always nail through the thin piece first.



Superencias para el Consumidor

Los grandes almacenes (convenience stores) generalmente venden clavos previamente empaquetados. Las ferreterías y los almacenes de materiales de construcción venden clavos por libra de peso y por KEG (50 a 80 libras). El precio es por lo general más alto por clavos previamente empaquetados que por los que se compran por libra de peso. Los clavos pre-empaquetados casi siempre incluyen un surtido de tamaños diferentes en el mismo paquete. La peor manera de comprar clavos es comprar paquetes que contengan clavos de tamaños diferentes ya que además del costo más alto, muchos de los clavos no son del tamaño adecuado para los trabajos que usted necesita hacer y no podrán ser usados. El KEG, a pesar de ser más barato por clavo que si se compra por paquete o por peso, deberá comprarse solamente para los grandes trabajos de construcción.

Consumer Tips

Convenience stores often sell prepackaged nails. Hardware and building supply stores sell nails by the pound and by the KEG. (50 to 80 pounds) The cost is frequently much higher for pre-packaged nails than for nails purchased by the pound. Pre-packaged nails often include assorted sizes in the same package. A package with assorted nails is the least desirable way to buy nails, since along with the higher cost, many of the nails are the wrong size for your jobs and will not be used. The keg, although it is cheaper per nail than the pound or package, should only be purchased for large construction jobs.

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BUYING NAILS

STUDENT WORKSHEETS

INSTRUCTIONS: Fill out these worksheets after reading through the information booklet. If necessary, use the booklet to find the answers. Later you may be given a quiz on this information.

WORKSHEETS FOR NAILS

Please fill in the missing answers.

- 1.) The four most frequently used types of nails are:
 - a) _____ b) _____
 - b) _____ c) _____
- 2.) State one advantage of using nails to fasten wood.
- 3.) What special operations must be performed if hardwood is to be nailed?
- 4.) How are nail sizes designated?
- 5.) List three ways that nails can be purchased.
 - a) _____ b) _____
 - c) _____
- 6.) What tool or tools is (are) needed when nailing?
- 7.) When are finishing nails used?
- 8.) When purchasing special purpose nails, who should you consult?

- 9.) When fastening two pieces of wood of different thicknesses, always nail through the _____ piece first.
- 10.) Why is using the correct size nail important?

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BUYING NAILS

STUDENT QUIZ

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QUIZ

WRITE IN T for True or F for False for each question.

- _____ 1. Nails are mainly used with hardwood.
- _____ 2. Nails are the easiest wood fasteners to use.
- _____ 3. Always buy nails in small packages since this is the least expensive purchasing method.
- _____ 4. One should use nails that are the right size or larger.
- _____ 5. The common nail is used for rough carpentry jobs.
- _____ 6. A 20d (penny) nail means you get 20 nails for a penny.
- _____ 7. A 2d nail is the smallest common nail.
- _____ 8. Brads are the only frequently used nail which doesn't use the "d" (penny) classification.
- _____ 9. When fastening wood with nails, drive the nail through the thickest piece first.
- _____ 10. The box nail is used for assembling crates and boxes.